

A. Anthony Bloom

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Current position

April 2016 – present: Research scientist in terrestrial carbon-climate feedbacks at the NASA Jet propulsion laboratory, California Institute of Technology.

Work experience

March 2014 – April 2016: California Institute of Technology postdoctoral scholar at the NASA Jet Propulsion Laboratory, working on global carbon fluxes from fires and wetlands.

Dec 2011 – Feb 2014: Post-Doctoral Research Associate in Terrestrial Carbon Cycling. School of Geosciences, University of Edinburgh (UK).

Teaching experience

2008-2014 University of Edinburgh, School of GeoSciences, Matlab Course Organiser: Co-organised and taught Matlab for Geosciences transferable skills course to PhD students and research staff.

2007-2011 University of Edinburgh, Tutor and Teaching Assistant. Courses Included: Earth Modelling and Prediction, Atmospheric Dynamics, Structural Geology.

2005 University College London, Earth Sciences Dept., Tutorial Instructor
Taught computer programming (Matlab) to undergraduate and Master students

Education

2007 – 2011: University of Edinburgh (UK). PhD – Satellite-Based Estimation of Global Biogenic Methane Emissions.

2006 – 2007 University of Leeds (UK). Masters by Research (MRes) – Physics of the Earth and Atmosphere.

2002 – 2006 University College London (UK). MSci in Earth and Space Science.

Relevant Experience

Throughout my research I have used range of satellite datasets and model-data fusion approaches to address fundamental questions on carbon cycle dynamics within terrestrial ecosystems. My research experience includes Bayesian retrievals of carbon cycle state and process variables using satellite and ground-based carbon datasets; studies on carbon emissions from fires, and their role in the terrestrial carbon balance; top-down constraints on global and regional wetland CH₄ emissions and biogeochemical process controls.

Invited seminar talks

The role of memory in the evolution of the tropical carbon balance

- *Stanford University, Earth Systems Science Seminar, Nov 2017.*

Global data constraints on terrestrial carbon cycling

- *UC Irvine, Earth Systems Science department Seminar, Jan 2016.*

Satellite data constraints on biogenic and pyrogenic carbon fluxes.

- *Harvard, Atmospheric Sciences Seminar Series, February 2015.*
- *Caltech, Yuk Seminar Series, March 2015.*

Satellite based estimates of biogenic CH₄ and CO₂ fluxes

- *NOAA Boulder, April 2013.*
- *NASA Jet Propulsion Laboratory, April 2013.*

Large-scale observations of methanogenesis inferred from satellite measurements of methane and gravity

- *University of Oxford, Atmos., Ocean and Plan. Phys. Seminars, May 2009.*

Awards

NASA Early Career Public Achievement Medal (2017), University of Edinburgh EUSA Teaching Award Nomination (2010), University College London, Friends Programme Scholarship (2006 and 2005), University College London Academic excellence award (2004).

Peer-reviewed publications

Exbrayat J-F, **Bloom AA**, et al. (2019). Understanding the Land Carbon Cycle with Space Data: Current Status and Prospects. *Surveys in Geophysics*, 1-21.

Exbrayat, J-F, Smallman TL, **Bloom AA**, et al. (2018). Inverse determination of the influence of fire on vegetation carbon turnover in the pantropics. *Global Biogeochemical Cycles*, 32(12), 1776-1789.

Wang Y, et al., inc. **Bloom AA** (2018). GOLUM-CNP v1. 0: a data-driven modeling of carbon, nitrogen and phosphorus cycles in major terrestrial biomes. *Geoscientific Model Development*, 11(9), 3903-3928.

Sheng J, et al., inc. **Bloom AA** (2018). 2010–2016 methane trends over Canada, the United States, and Mexico observed by the GOSAT satellite: contributions from different source sectors. *Atmospheric Chemistry and Physics*, 18(16), 12257-12267.

Liu J, Bowman KW, Parazoo N, **Bloom, AA**, et al (2018). Detecting drought impact on terrestrial biosphere carbon fluxes over contiguous US with satellite observations. *Environmental Research Letters*.

Jeong SJ, **Bloom AA**, et al. (2018): Accelerating rates of Arctic carbon cycling revealed by long-term atmospheric CO₂ measurements. *Science advances*, 4(7), eaao1167.

Parker RJ, et al., inc **Bloom AA** (2018). Evaluating year-to-year anomalies in tropical wetland methane emissions using satellite CH₄ observations. *Remote Sensing of Environment*, 211, 261-275.

Treat CC, **Bloom AA**, et al. (2018): Nongrowing season methane emissions—a significant component of annual emissions across northern ecosystems. *Global change biology* 24(8) 3331-3343.

- Exbrayat JF, **Bloom AA**, et al. (2018). Reliability ensemble averaging of 21st century projections of terrestrial net primary productivity reduces global and regional uncertainties. *Earth System Dynamics*, 9(1), 153-165.
- Sheng J, et al., inc **Bloom AA** (2018): 2010–2016 methane trends over Canada, the United States, and Mexico observed by the GOSAT satellite: contributions from different source sectors, *Atmospheric Chemistry and Physics*, 18, 12257-12267.
- Sheng J, et al., inc **Bloom AA** (2018). High-resolution inversion of methane emissions in the Southeast US using SEAC4RS aircraft observations of atmospheric methane: anthropogenic and wetland sources. *Atmospheric Chemistry and Physics*, 18, 6483-6491.
- Solomonidou A, et al., inc **Bloom AA** (2018). The Spectral Nature of Titan's Major Geomorphological Units: Constraints on Surface Composition. *Journal of Geophysical Research: Planets*, 123(2), 489-507.
- Bloom AA**, et al. (2017): A global wetland methane emissions and uncertainty dataset for atmospheric chemical transport models (WetCHARTs version 1.0), *Geoscientific Model Development*, 10, 2141-2156.
- Liu J, Bowman KW, et al., inc. **Bloom AA** (2017). Contrasting carbon cycle responses of the tropical continents to the 2015–2016 El Niño. *Science*, 358(6360), eaam5690.
- Slevin D, et al., inc. **Bloom AA** (2017). Global evaluation of gross primary productivity in the JULES land surface model v3. 4.1. *Geoscientific Model Development*, 10(7), 2651-2670.
- Worden, JR, **Bloom AA**, et al. (2017): Reduced biomass burning emissions reconcile conflicting estimates of the post-2006 atmospheric methane budget. *Nature communications*, 8(1), 2227.
- Smallman TL, et al., inc **Bloom AA** (2017). Assimilation of repeated woody biomass observations constrains decadal ecosystem carbon cycle uncertainty in aggrading forests. *Journal of Geophysical Research: Biogeosciences*, 122(3), 528-545.
- Bowman KW, Liu J, **Bloom AA** et al. (2017) Global and Brazilian carbon response to El Niño Modoki 2011–2010. *Earth and Space Science*, 4(10), 637-660.
- Bloom AA**, et al. (2016) What are the greenhouse gas observing system requirements for reducing fundamental biogeochemical process uncertainty? Amazon wetland CH₄ emissions as a case study. *Atmospheric Chemistry and Physics*, 16: 15199-15218.
- Maasakkers JD., et al., inc. **Bloom AA** (2016) Gridded national inventory of US methane emissions. *Environmental Science & Technology*, 50 (23): 13123–13133.
- Wilson C, et al., inc. **Bloom AA** (2016) Contribution of regional sources to atmospheric methane over the Amazon Basin in 2010 and 2011. *Global Biogeochemical Cycles*, 30 (3), 400–420
- Bloom AA**, et al. (2016) The decadal state of the terrestrial carbon cycle: Global retrievals of terrestrial carbon allocation, pools, and residence times. *Proceedings of the National Academy of Sciences*: 113 (5) 1285-1290;
- Revill A, **Bloom AA**, Williams M (2016) Impacts of reduced model complexity and driver resolution on cropland ecosystem photosynthesis estimates. *Field Crops Research* 187: 74-86.
- Worden JR, Turner AJ, **Bloom A**, et al. (2015) Quantifying lower tropospheric methane concentrations using GOSAT near-IR and TES thermal IR measurements. *Atmospheric Measurement Techniques* 8: 3433–3445
- Bloom AA**, et al. (2015) Remote sensing constraints on South America fire traits by Bayesian fusion of atmospheric and surface data. *Geophysical Research Letters*

42(4): 1268-1274.

- Bloom AA**, Williams M. (2015) Constraining ecosystem carbon dynamics in a data-limited world: integrating ecological "common sense" in a model–data fusion framework. *Biogeosciences* 12: 1299-1315.
- Clare A, Simon S, Joseph S, Hammond J, Pan G, **Bloom A.** (2014) Competing uses for China's straw: the economic and carbon abatement potential of biochar. *GCB Bioenergy* 7: 1272–1282
- Hill TC, Williams M, **Bloom AA**, Mitchard ETA, Ryan CM (2013) Are inventory based and remotely sensed above-ground biomass estimates consistent? *PloS one* 8 (9): e74170.
- Bloom AA**, et al. (2012) Seasonal variability of tropical wetland CH₄ emissions: the role of the methanogen-available carbon pool. *Biogeosciences* 9: 2821-2830.
- Bloom AA**, et al. (2010) Global methane emission estimates from ultraviolet irradiation of terrestrial plant foliage. *New Phytologist* 187(2): 417-425.
- Bloom AA**, et al. (2010) Large-scale controls of methanogenesis inferred from methane and gravity spaceborne data. *Science* 327(5963): 322-325.
- Brooks IM, et al., inc. **Bloom AA** (2009) Physical exchanges at the air-sea interface: UK-SOLAS Field Measurements. *Bulletin of the American Meteorological Society* 90(5): 629-644.
- Bloom A**, et al. (2008) Climate change impact of wind energy availability in the Eastern Mediterranean using the regional climate model PRECIS." *Nat. Hazards and Earth Sys. Sci.* (8): 1249-1257.

Other publications

- Stavros EN, Jeong S, and **Bloom A** (2014) Synthesizing Remote Sensing Data on the Carbon and Water Cycles. *Eos, Transactions American Geophysical Union* 95 (29): 265-265.